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Amendment Dated August 2, 2004

Amendment of Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1 (original). A liquid cooling system comprising:

a heat exchange unit coupled to a conduit, the heat exchange unit receiving heated liquid transported on the conduit and generating cooled liquid which is transported on the conduit; and

a heat transfer unit capable of interfacing with a processor and coupled through the conduit to the heat exchange unit, the heat transfer unit receiving the cooled liquid transported on the conduit and generating the heated liquid transported on the conduit.

2 (original). A liquid cooling system as set forth in claim 1, wherein the liquid cooling system is deployed in a housing.

3 (original). A liquid cooling system as set forth in claim 1, the heat exchange unit further comprising an input cavity coupled to the conduit and receiving the heated liquid.

4 (original). A liquid cooling system as set forth in claim 1, the heat exchange unit further comprising a dissipater generating the cooled liquid.

5 (original). A liquid cooling system as set forth in claim 1, the heat exchange unit further comprising an output cavity coupled to the conduit and capable of storing the cooled liquid transported on the conduit.

6 (original). A liquid cooling system as set forth in claim 1, wherein the heat exchange unit further comprises an input cavity coupled to the conduit and receiving the

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heated liquid, a dissipater coupled to the input cavity and generating the cooled liquid and an output cavity coupled to dissipater and receiving the cooled liquid.

7 (original). A liquid cooling system as set forth in claim 1, the conduit further comprising an input conduit capable of transporting the heated liquid and an output conduit capable of transporting the cooled liquid.

8 (original). A liquid cooling system as set forth in claim 1, wherein the heat exchange unit further comprises an output cavity and wherein a pump is disposed in the output cavity and the cooled liquid is transported on the conduit in response to operating the pump.

9 (original). A liquid cooling system as set forth in claim 1, wherein a pump is a self-priming pump.

10 (original). A liquid cooling system as set forth in claim 1, wherein the heat exchange unit further comprises an output cavity and wherein an impeller is disposed in the output cavity and the cooled liquid is transported on the conduit in response to operating the impeller.

11 (original). A liquid cooling system as set forth in claim 1, wherein the heat exchange unit further comprises a dissipater generating the cooled liquid, the dissipater further comprising fins.

12 (original). A liquid cooling system as set forth in claim 1, wherein the heat exchange unit further comprises a dissipater, the dissipater further comprising liquid tubes transporting the cooled liquid.

13 (original). A liquid cooling system as set forth in claim 1, wherein the liquid cooling system further comprising a motor coupled to the heat exchange unit and

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wherein the heat exchange unit further comprises a dissipater coupled to an output cavity, the output cavity including an impeller disposed therein and wherein a shaft couples the motor to the impeller through the dissipater, the motor operating the impeller through the shaft.

14 (original). A liquid cooling system as set forth in claim 1, wherein the liquid cooling system further comprising a fan positioned to direct air through the heat exchange unit.

15 (original). A liquid cooling system as set forth in claim 1, wherein the heat transfer unit further comprising an inlet coupled to the conduit and an outlet positioned above the inlet and coupled to the conduit and wherein the cooled liquid enters the heat transfer unit at the inlet and the heated liquid exits the heat transfer unit at the outlet.

16 (original). A liquid cooling system as set forth in claim 1, wherein the heat exchange unit further comprising an input cavity coupled to the conduit and wherein the heated liquid enters the heat exchange unit at the input cavity and an output cavity positioned below the input cavity and coupled to the conduit and wherein the cooled liquid exits the heat exchange unit from the output cavity.

17 (original). A liquid cooling system as set forth in claim 1, wherein the heat transfer unit and the heat exchange unit are deployed in a single unit.

18 (original). A liquid cooling system as set forth in claim 1, wherein the heated liquid comprises a propylene glycol based coolant.

19 (original). A liquid cooling system comprising:
an input conduit transporting heated liquid including heat;
a heat exchange unit comprising, an input cavity coupled to the input conduit and receiving the heated liquid including heat, a dissipater coupled to the input cavity and

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dissipating the heat thereby generating cooled liquid, and an output cavity coupled to the dissipater and receiving the cooled liquid;
an output conduit coupled to the output cavity and transporting the cooled liquid;
and

a heat transfer unit interfacing with a processor generating the heat and coupled through the input conduit and the output conduit to the heat exchange unit, the heat transfer unit receiving the cooled liquid transported on the output conduit, generating the heated liquid transported on the input conduit by transferring the heat to the cooled liquid and transporting the heated liquid on the input conduit.

20 (original). A method of dissipating heat from a processor deployed in a housing, the method comprising the steps of:

performing forced circulation of liquid to transport the heat from the processor;
performing convective circulation of liquid to transport the heat from the processor; and

dissipating the heat in the processor in response to performing the forced circulation of the liquid and in response to performing the convective circulation of the liquid.

21 (original). A method of dissipating heat from a processor deployed in a housing as set forth in claim 20, wherein the step of dissipating the heat in the processor is performed in response to performing the forced circulation of the liquid, in response to performing the convective circulation of the liquid and in response to expelling air from the housing.

22 (original). A method of dissipating heat from a processor deployed in a housing as set forth in claim 20 wherein the step of dissipating the heat in the processor is performed in response to performing the forced circulation of the liquid, in response to performing the convective circulation of the liquid and in response to directing air flow through a heat exchange unit.

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23 (original). A method of cooling a processor capable of generating heat, the processor in contact with a heat transfer unit, the heat transfer unit including an outlet positioned above an inlet, the heat transfer unit coupled to a heat exchange unit, the heat exchange unit comprising an input cavity, a heat dissipater positioned below the input cavity and an output cavity positioned below the heat dissipater, the method comprising the steps of:

receiving cooled liquid in the inlet of the heat transfer unit;

generating heated liquid in response to transferring the heat from the processor and in response to receiving the cooled liquid in the inlet of the heat transfer unit;

outputting heated liquid out of the outlet of the heat transfer unit in response to generating the heated liquid;

receiving the heated liquid in the input cavity of the heat exchange unit in response to outputting the heated liquid out of the outlet of the heat transfer unit;

generating cooled liquid in the dissipater in response to receiving the heated liquid in the input cavity; and

outputting the cooled liquid to the output cavity in response to generating cooled liquid in the dissipater.

24 (original). A method of cooling a processor deployed in a system after system shutdown, the processor capable of generating heat, the processor coupled to a heat transfer unit, the heat transfer unit including an outlet positioned above an inlet, the heat transfer unit coupled to a heat exchange unit, the heat exchange unit comprising an input cavity, a dissipater positioned below the input cavity and an output cavity positioned below the dissipater, the method comprising the steps of:

generating first liquid circulation by receiving cooled liquid in the inlet of the heat transfer unit, heating the cooled liquid in the heat transfer unit, and outputting heated liquid out of the outlet of the heat transfer unit;

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generating second liquid circulation by receiving heated liquid in the input cavity, cooling the heated liquid in the dissipater and outputting the cooled liquid from the output cavity; and

cooling a processor deployed in a system after system shutdown in response to generating first liquid circulation and in response to generating second liquid circulation.

25 (original). A two-piece liquid cooling system comprising:

a heating unit comprising a first output conduit receiving cooled fluid, a heat transfer unit capable of attachment to a processor and coupled to the first output conduit, the heat transfer unit transforming the cooled fluid to heated fluid and a first input conduit coupled to the heat transfer unit and transporting the heated fluid; and

a cooling unit comprising a second input conduit coupled to the first input conduit and transporting the heated fluid, a heat exchange unit coupled to the second input conduit, the heat exchange unit generating the cooled fluid in response to the heated fluid transported on the second input conduit, a second output conduit coupled to the heat exchange unit, the second output conduit coupled to the first output conduit and transporting the cooled liquid from the heat exchange unit to the first output conduit.

26 (original). A liquid cooling system comprising:

a heat exchange means coupled to a conduit means, the heat exchange means for receiving heated liquid transported on the conduit means and generating cooled liquid which is transported on the conduit means; and

a heat transfer means capable of interfacing with a processor and coupled through the conduit means to the heat exchange means, the heat transfer means receiving the cooled liquid transported on the conduit means and generating the heated liquid transported on the conduit means.

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27 (new). A method of operating a liquid cooling system comprising the steps of: performing convective circulation in the liquid cooling system; and consuming less power in the liquid cooling system in response to performing convective circulation.

28 (new). A heat exchange system comprising:
an input cavity positioned to receive liquid heated by a processor;
a heat dissipater coupled to the input cavity, the heat dissipater generating cooled liquid by dissipating heat from the liquid heated by the processor; and
an output cavity coupled to the heat dissipater and positioned on an oppositely disposed side of the heat dissipater from the input cavity, the output cavity receiving the cooled liquid generated by the heat dissipater, the output cavity positioned to output the cooled liquid to a processor.

29 (new). A heat exchange system as set forth in claim 28, further comprising a pump wherein the pump is deployed in the output cavity.

30 (new). A heat exchange system as set forth in claim 28, the pump further comprising an impeller, the impeller comprising curved blades including an inside arc wherein the inside arc faces away from a direction of rotation of the impeller.

31 (new). A heat exchange system as set forth in claim 28, further comprising a self-priming pump deployed in the output cavity.

32 (new). A heat exchange unit as set forth in claim 28, the heat dissipater comprising multiple paths coupled between the input cavity and the output cavity.

33 (new). A motherboard further comprising the heat exchange system as set forth in claim 28.

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34 (new). A computer further comprising the heat exchange system as set forth in claim 28.

35 (new). A communication system further comprising the heat exchange system as set forth in claim 28.

36 (new). A personal data assistant further comprising the heat exchange system as set forth in claim 28.

37 (new). A cellular telephone further comprising the heat exchange system as set forth in claim 28.

38 (new). A device including a processor further comprising the heat exchange system as set forth in claim 28.

39 (new). A mobile device further comprising the heat exchange system as set forth in claim 28.

40 (new). A laser system further comprising the heat exchange system as set forth in claim 28.

41. (new) A method of operating a liquid cooling system, comprising the steps of: operating a heat exchange system the heat exchange system comprising, an input cavity receiving liquid heated by a processor; a heat dissipater coupled to the input cavity, the heat dissipater generating cooled liquid by dissipating heat from the liquid heated by the processor; and an output cavity coupled to the heat dissipater and positioned on an oppositely disposed side of the heat dissipater from the input cavity, the output cavity receiving the cooled liquid generated by the heat dissipater; and generating convective liquid circulation in response to operating the heat exchange system.

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42. (new) A heat transfer system comprising:
a housing;
a contact unit coupled to the housing and forming a cavity for conveying liquid, the contact unit capable of transporting heat from a processor to the liquid thereby producing heated liquid, which rises in the cavity;
an inlet positioned in the housing to provide and input into the cavity for the liquid; and
an outlet positioned in the housing to provide and exit point for the liquid after the heated liquid rises in the cavity.

43 (new). A motherboard further comprising the heat transfer system as set forth in claim 42.

44 (new). A computer further comprising the heat transfer system as set forth in claim 42.

45 (new). A communication system further comprising the heat transfer system as set forth in claim 42.

46 (new). A personal data assistant further comprising the heat transfer system as set forth in claim 42.

47 (new). A cellular telephone further comprising the heat transfer system as set forth in claim 42.

48 (new). A device including a processor further comprising the heat transfer system as set forth in claim 42.

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49 (new). A mobile device further comprising the heat transfer system as set forth in claim 42.

50 (new). A laser system further comprising the heat transfer system as set forth in claim 42.

51. (new) A method of operating a liquid cooling system comprising the steps of: operating a heat transfer system, the heat transfer system comprising, a housing, a contact unit coupled to the housing and forming a cavity for conveying liquid, the contact unit capable of transporting heat from a processor to the liquid thereby producing heated liquid, which rises in the cavity, an inlet positioned in the housing to provide and input into the cavity for the liquid, and an outlet positioned in the housing to provide and exit point for the liquid after the heated liquid rises in the cavity; and generating convective liquid circulation in response to operating the heat transfer system.